

**DRAFT ENVIRONMENTAL RESTORATION
RFCA STANDARD OPERATING PROTOCOL
FOR ROUTINE SOIL REMEDIATION
FY03 NOTIFICATION #03-02
IHSS GROUP SW-1
IHSS'S 133.1, 133.2, 133.4 AND PAC SW-1702**

DOCUMENT CLASSIFICATION
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ADMIN RECORD

BZ-A-000562

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**ENVIRONMENTAL RESTORATION
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ACRONYMS

AL	action level
AOC	area of concern
BZ	Buffer Zone
BZ SAP	Buffer Zone Sampling and Analysis Plan
DOE	Department of Energy
ER	Environmental Restoration
ER RSOP	Environmental Restoration RSOP for Routine Soil Remediation
ft.	feet
FY	Fiscal Year
IA	Industrial Area
IHSS	Individual Hazardous Substance Site
IMP	Integrated Monitoring Program
PAC	Potential Area of Concern
pCi/g	picocurie per gram
PCOC	potential contaminant of concern
RFCA	Rocky Flats Cleanup Agreement
RFETS	Rocky Flats Environmental Technology Site
RSOP	RFCA Standard Operating Protocol
TDEM	time domain electromagnetic area
ug/l	microgram per liter
VOC	volatile organic compound

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1 INTRODUCTION

This Environmental Restoration (ER) Rocky Flats Cleanup Agreement (RFCA) Standard Operating Protocol (RSOP) for Routine Soil Remediation (ER RSOP) (DOE 2002a) Fiscal Year (FY) 03 Notification includes the notification to remediate Individual Hazardous Substance Sites (IHSSs) and a Potential Area of Concern (PAC) site in the Rocky Flats Environmental Technology Site (RFETS) southwestern Buffer Zone (BZ) during FY03. The purpose of this Notification is to invoke the ER RSOP for IHSS Group SW-1, IHSS's 133.1, 133.2, 133.4, and PAC SW-1702. Activities specified in the ER RSOP are not reiterated here; however deviations from the ER RSOP are noted where appropriate.

IHSS Group SW-1, IHSSs 133.1, 133.2, 133.4, and PAC SW-1702 consist of ash pits that contain soil, ash, and debris. IHSS Group SW-1 also includes IHSSs 133.3 – Ash Pit #3, 133.5 – Incinerator, 133.6 – Concrete Wash Pad, and PAC SW-1701 – Recently Identified Ash Pit that are not included in this Notification. The proposed remediation sites covered under this Notification are listed in Table 1 and shown on Figure 1. The current status of the other sites that are part of IHSS Group SW-1 not included in this Notification are listed in Table 2.

Table 1
FY03 Potential Remediation Areas for IHSS Group SW-1

IHSS Group	IHSS/PAC/UBC Site	PCOCs	Media	Estimated Remediation Volume
SW-1	133.1 – Ash Pit #1	radionuclides metals	subsurface soil	3,376 cubic yards total
	133.2 – Ash Pit #2	radionuclides metals	subsurface soil	
	133.4 – Ash Pit #4	radionuclides metals	subsurface soil	
	SW-1702 – Recently Identified Ash Pit	radionuclides metals	subsurface soil	

Table 2
Other Sites in IHSS Group SW-1 Not Included in this Notification

IHSS Group	IHSS/PAC/UBC Site	Current Status
SW-1	133.3 – Ash Pit #3	Accepted as an NFA on February 12, 2002.
	133.5 – Incinerator	Additional sampling needed for an NFA determination.
	133.6 – Concrete Wash Pad	Additional sampling needed for an NFA determination.
	SW-1701 – Recently Identified Ash Pit	Additional sampling needed for an NFA determination.

NFA = No Further Action

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2 IHSS GROUP SW-1

IHSS Group SW-1, IHSSs 133.1, 133.2, 133.4, and PAC SW-1702 are located approximately 0.9 mile east of the west guard gate and approximately 400 feet south of the West Access Road. These IHSSs and PAC are ash pits that are 150 to 200 feet long, approximately 12 feet wide, approximately 10 feet deep, and are covered with approximately three feet of topsoil. The pits contain ash from the former incinerator (IHSS 133.5) that was located northeast of the pits and operated from approximately 1952 to 1968 (DOE 1992 and 2001b). A cross-section representative of the ash pits is shown on Figure 2.

2.1 Potential Contaminants of Concern

Potential contaminants of concern (PCOCs) at IHSS Group SW-1 are listed in Table 1 and were determined based on historical knowledge and data collected during previous investigations (DOE 1992, 1996, 2001a, and 2002b). The PCOCs are radionuclides and metals above RFCA action levels (ALs). Existing analytical data for surface and subsurface soils are presented on Figures 3 and 4. A comparison of the analytical results for plutonium to the agreed remediation level of 50 pCi/g for this IHSS Group is shown on Table 3.

Figure 2 - Cross-Section Representative of the Ash Pits

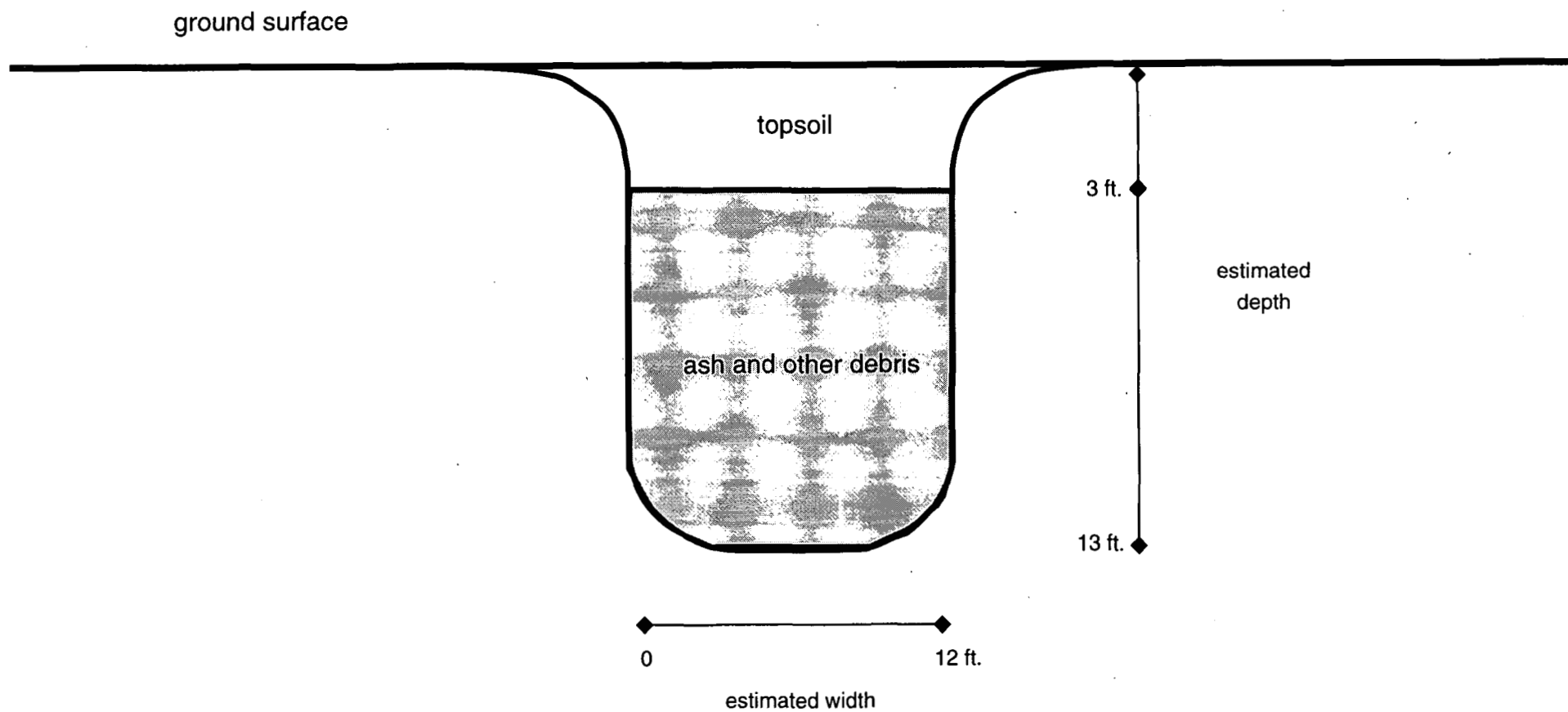


Table 3
Comparison of Analytical Results of Plutonium to the Agreed Remediation Level of 50 pCi/g for IHSS Group SW-1

Location Code	Northing	Easting	Analyte	Result	Unit	Detection Limit	Background Mean + 2SD	Action Level	Beginning Depth (feet)	Ending Depth (feet)
SS515493	747415	2079695	Plutonium-239/240	0.10	pCi/g	0.003	0.066	50	0	0.17
SS515493	747415	2079695	Plutonium-239/240	0.082	pCi/g	0.003	0.066	50	0.17	0.33
SS514493	747565	2079845	Plutonium-239/240	0.074	pCi/g	0.005	0.066	50	0	0.17
SS513793	747594	2079454	Plutonium-239/240	0.071	pCi/g	0.002	0.066	50	0	0.17
61193	2080053	747408	Plutonium-239/240	0.028	pCi/g	0.003	0.02	50	0	2
57294	2080479	747659	Plutonium-239/240	0.21	pCi/g	0.019	0.02	50	0	4
56893	2080475	747657	Plutonium-239/240	0.94	pCi/g	0.041	0.02	50	2	4
55293	2079429	747620	Plutonium-239/240	0.027	pCi/g	0.002	0.02	50	0	6
58893	2079962	747475	Plutonium-239/240	0.066	pCi/g	0.002	0.02	50	0	6
55894	2079715	747538	Plutonium-239/240	0.071	pCi/g	0.0057	0.02	50	0	6
55894	2079715	747538	Plutonium-239/240	0.072	pCi/g	0.0057	0.02	50	0	6
56094	2079812	747544	Plutonium-239/240	0.74	pCi/g	0.018	0.02	50	0	6
55694	2079584	747491	Plutonium-239/240	0.36	pCi/g	0.082	0.02	50	0	6
55993	2079541	747498	Plutonium-239/240	0.82	pCi/g	0.19	0.02	50	0	6
55994	2079761	747547	Plutonium-239/240	5.2	pCi/g	2.5	0.02	50	0	6
55994	2079761	747547	Plutonium-239/240	5.2	pCi/g	2.5	0.02	50	0	6
56393	2080003	747508	Plutonium-239/240	0.83	pCi/g	0.0041	0.02	50	2	6
58093	2079688	747478	Plutonium-239/240	0.53	pCi/g	0.018	0.02	50	0	8
56393	2080003	747508	Plutonium-239/240	0.087	pCi/g	0.012	0.02	50	6	8
56893	2080475	747657	Plutonium-239/240	0.79	pCi/g	0.086	0.02	50	4	8.3
55993	2079541	747498	Plutonium-239/240	0.33	pCi/g	0.008	0.02	50	4	9.3
55993	2079541	747498	Plutonium-239/240	0.27	pCi/g	0.011	0.02	50	4	9.3
55694	2079584	747491	Plutonium-239/240	0.13	pCi/g	0.056	0.02	50	6	11
55994	2079761	747547	Plutonium-239/240	0.25	pCi/g	0.064	0.02	50	6	11
55994	2079761	747547	Plutonium-239/240	0.25	pCi/g	0.064	0.02	50	6	11
56094	2079812	747544	Plutonium-239/240	0.55	pCi/g	0.0064	0.02	50	6	12
56093	2079605	747511	Plutonium-239/240	0.059	pCi/g	0.006	0.02	50	8	12
56094	2079812	747544	Plutonium-239/240	0.3	pCi/g	0.019	0.02	50	18	22

SD = Standard Deviation

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2.2 Project Conditions

The following conditions are present at this site:

- Six ash pits, four of which will be remediated, encompassing approximately 0.19 acre of land;
- The ash pits are located south and southeast of the former incinerator (IHSS 133.5) and the recently identified ash pit (PAC SW-1701), east of the concrete wash pad (IHSS 133.6), and on the east and west sides of Ash Pit #3 (IHSS 133.3);
- The ash pits are covered predominately with prairie grasses and cacti. A dirt access road traverses the area, east to west. No man-made structures exist at the site; and
- The ash pits slope down to the east-southeast towards Woman Creek and the South Interceptor Ditch (SID).

2.3 Remediation Plan

This RSOP Notification remediation plan for IHSS Group SW-1, IHSSs 133.1, 133.2, 133.4, and PAC SW-1702 includes the following objectives:

- Remove all waste material from a depth of approximately 3 to 13 feet from the ash pits and dispose of offsite;
- Backfill the excavation with clean fill including the top 3 feet of topsoil removed from the ash pits; and
- Grade and seed the area.

The location of the remediation areas is shown on Figure 5.

2.4 Stewardship Evaluation

The remediation area includes all of the ash in the four pits, but does not include native soil outside of the ash pits boundaries. The following sections present the stewardship evaluation.

2.4.1 Proximity to Other Contaminant Sources

IHSSs 133.1, 133.2, 133.4, and SW-1702 are located in the RFETS southwestern BZ on the southern side of the West Access Road. The ash pits are located south and southeast of the former incinerator (IHSS 133.5) and the recently identified ash pit (PAC SW-1701), east of the concrete wash pad (IHSS 133.6), and east and west of Ash Pit #3 (IHSS 133.3). The incinerator, recently identified ash pit, and concrete wash pad need additional sampling to confirm a No Further Action (NFA) determination. Ash Pit 3 has been accepted as an NFA (DOE 2002c).

2.4.2 Surface Water Protection

Surface water protection includes the following considerations:

2.4.2.1 Is there a pathway to surface water from potential erosion to streams or drainages?

The ash pits are located in an area that slopes to the east-southeast; however, they have a vegetative cover that prevents significant erosion. In addition, the waste material in the ash pits is covered by approximately three feet of soil. Surface water runoff from the area flows into Woman Creek and the South Interceptor Ditch. The South Interceptor ditch flows into Woman Creek, which is monitored on a regular basis.

2.4.2.2 Do characterization data indicate there are contaminants in surface soil?

Data on surface soil contaminant concentrations within each individual IHSSs and PAC are not available. Nearby surface soil data is shown on Figure 3. In addition, waste material is covered by approximately three feet of soil.

After the ash material is removed from the pits, the area will be backfilled with clean soil and the existing cover material. It is anticipated that all potential contaminant concentrations in surface soil will be less than background means plus two standard deviations in accordance with the ER RSOP (DOE 2002a).

2.4.2.3 Do monitoring results from Points of Evaluation (POEs) or Points of Compliance (POCs) indicate there are surface water impacts from the area under consideration?

The POEs and POCs downstream of the ash pits indicate concentrations of metals and radionuclides above RFCA surface water standards; however, none of these constituents have been detected above soil RFCA ALs in the ash pits. In addition, PCOCs at the ash pits have not been detected further downgradient at POE SW027 or Pond C-2 above RFCA surface water standards (DOE 2001a). Based on this data coupled with the fact

that the ash pits are covered with approximately three feet of soil and a vegetative cover, it appears unlikely that the ash pits have caused significant surface water impacts.

2.4.2.4 Is the IHSS Group in an area with high erosion potential, based on the 100-Year Average Erosion Map?

The 100-Year Average Erosion Map (Figure 11, DOE 2002a) indicates that IHSS Group SW-1 is located in an area of 0.010 to 0.025 kg/m² soil detachment.

2.4.3 Monitoring

Monitoring includes the following considerations:

2.4.3.1 Do monitoring results from POEs or POCs indicate there are groundwater impacts from the area under consideration?

Groundwater samples were taken from 16 wells in the ash pits area between 1986 and 1995 to determine whether the ash pits impacted groundwater. Metals, radionuclides, and VOCs were found above RFCA Tier II ALs and chromium VI was found above the RFCA Tier I AL (DOE 2001a). The monitoring well locations are shown on Figure 5 (DOE 2001a).

Additional groundwater samples were taken from five wells in the ash pits area in August 2001 and were analyzed for metals and radionuclides. Two additional wells (52193 and 56294) were selected for sampling, however, both were too dry to sample. All of the analytical results were below RFCA Tier I ALs. Uranium-233 and -234 were above Tier II ALs in three of the locations. Groundwater from two wells, 5686 and 55194, contained metals above RFCA Tier II ALs and groundwater concentrations at well 55194 were at or just above RFCA Tier II ALs. Well 5686 had concentrations of chromium, molybdenum, nickel, and thallium above RFCA Tier II ALs. This well is downgradient of the ash pits, but is not associated with any particular ash pit. Chromium was above the RFCA Tier II AL (DOE 2001a).

The sample that contained chromium VI at 160,000 micrograms per liter (ug/L) above the Tier I AL was collected from a downgradient well (5685) in October 1986. However, this result might be anomalous because the well was sampled for metals, including chromium VI, on eight occasions after this result and the results ranged between 4.2 and 270 ug/L. In addition, chromium was not found in significant quantities in the ash pits area (DOE 2001a).

VOCs detected sporadically in downgradient wells are unlikely to be from the ash pits because they would have been driven off or destroyed in the incinerator and would not be found in the residual ash.

Based on this data, it appears that the ash pits associated with IHSSs 133.1, 133.2, 133.4, and PAC SW-1702 may be the source of metals and radionuclide concentrations detected above RFCA Tier II ALs in downgradient groundwater wells.

After the ash material is removed from the pits, the area will be backfilled with clean soil and the existing cover material. It is anticipated that all potential contaminant concentrations in the subsurface will be less than background means plus two standard deviations in accordance with the ER RSOP (DOE 2002a).

2.4.3.2 Can the impact be traced to a specific IHSS Group?

Impacts on groundwater quality could be from multiple sources including IHSS Group SW-1.

2.4.3.3 Are additional monitoring stations needed?

No; there are sufficient monitoring wells in the area.

2.4.3.4 Can existing monitoring locations be deleted if additional remediation is conducted?

Monitoring well placement will be reevaluated after ash removal as part of the IMP. Some wells may be required to evaluate groundwater quality in the southwestern BZ.

2.4.4 Stewardship Actions and Recommendations

Because the ash material will be removed from the pits, and the area will be backfilled with clean soil and the existing cover material, all potential contaminant concentrations in the subsurface will be less than background means plus two standard deviations in accordance with the ER RSOP (DOE 2002a).

The current stewardship actions and recommendations for IHSS Group SW-1 are as follows:

- Use Best Management Practices to reduce erosion into surface water drainage (Section 7.2 of the ER RSOP).
- Implement near-term institutional controls until final closure and stewardship decisions are implemented, including the following:
 - Signs and barriers;
 - Restrictions on soil excavation; and
 - Soil excavations controlled through the Site Soil Disturbance Permit process.
- Implement long-term stewardship actions, including the following:
 - Continuing Federal ownership and control over the Site; and
 - Land use restrictions in accordance with the Site's Long-Term Stewardship Plan.

These recommendations may change based on in-process remediation activities and other future RFETS remediation decisions.

2.5 Accelerated Action Remediation Goals

ER RSOP remedial action objectives include the following:

1. Provide a remedy consistent with the RFETS goal of protection of human health and the environment;

2. Provide a remedy that minimizes the need for long-term maintenance and institutional or engineering controls; and
3. Minimize the spread of contaminants during implementation of accelerated actions.

The accelerated action remediation goals for the ash pits include the following:

- Remove all waste material from the designated ash pits and dispose of offsite, and
- Reclaim the site to enable use as a wildlife refuge.

2.6 Treatment

Not applicable.

2.7 Project-Specific Monitoring

Environmental monitoring, including downstream surface water and downgradient groundwater monitoring, will be conducted as part of the Integrated Monitoring Program (IMP) to ensure that contaminant concentrations are not increasing and that water quality standards are being met (DOE 2001b).

Project-specific surface water, groundwater, and air monitoring during remediation will be planned through the IMP process. Additional air monitoring will be conducted in accordance with Work Controls in order to document the absence of airborne activity. A potential air sampling location during remediation activities is shown on Figure 5.

2.8 Intended Waste Disposition

It is anticipated that most of the waste from the ash pits will be classified and disposed of as low level or low level mixed waste.

2.9 Administrative Record Documents

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Golden, Colorado, June.

DOE, 1996, Final Phase I RFI/RI Report, Woman Creek Priority Drainage, Operable Unit 5, Volumes I-IV, Rocky Flats Environmental Technology Site, Golden, Colorado, April.

DOE, 2001a, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2001b, Rocky Flats Environmental Technology Site, Integrated Monitoring Plan, Golden, Colorado.

DOE, 2002a, Environmental Restoration RFCA Standard Operating Protocol for Routine Soil Remediation, Rocky Flats Environmental Technology Site, Golden, Colorado, January.

DOE, 2002b, Buffer Zone Sampling and Analysis Plan, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

DOE, 2002c, Historical Release Report for the Rocky Flats Plant, Golden, Colorado, February.

2.10 Projected Schedule

Remediation of IHSS Group SW-1, IHSSs 133.1, 133.2, 133.4, and PAC SW-1702 will begin in the third or fourth quarter of FY03. The projected schedule to complete this project is two months.

3 PUBLIC PARTICIPATION

ER RSOP Notification #03-02 activities will be discussed at the November 2002 ER/Decontamination and Decommissioning Status meeting. This Notification is available at the Rocky Flats Reading Rooms.

4 REFERENCES

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Golden, Colorado, June.

DOE, 1996, Final Phase I RFI/RI Report, Woman Creek Priority Drainage, Operable Unit 5, Volumes I-IV, Rocky Flats Environmental Technology Site, Golden, Colorado, April.

DOE, 2001a, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2001b, Rocky Flats Environmental Technology Site, Integrated Monitoring Plan, Golden, Colorado.

DOE, 2002a, Environmental Restoration RFCA Standard Operating Protocol for Routine Soil Remediation, Rocky Flats Environmental Technology Site, Golden, Colorado, January.

DOE, 2002b, Buffer Zone Sampling and Analysis Plan, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

DOE, 2002c, Historical Release Report for the Rocky Flats Plant, Golden, Colorado, February.

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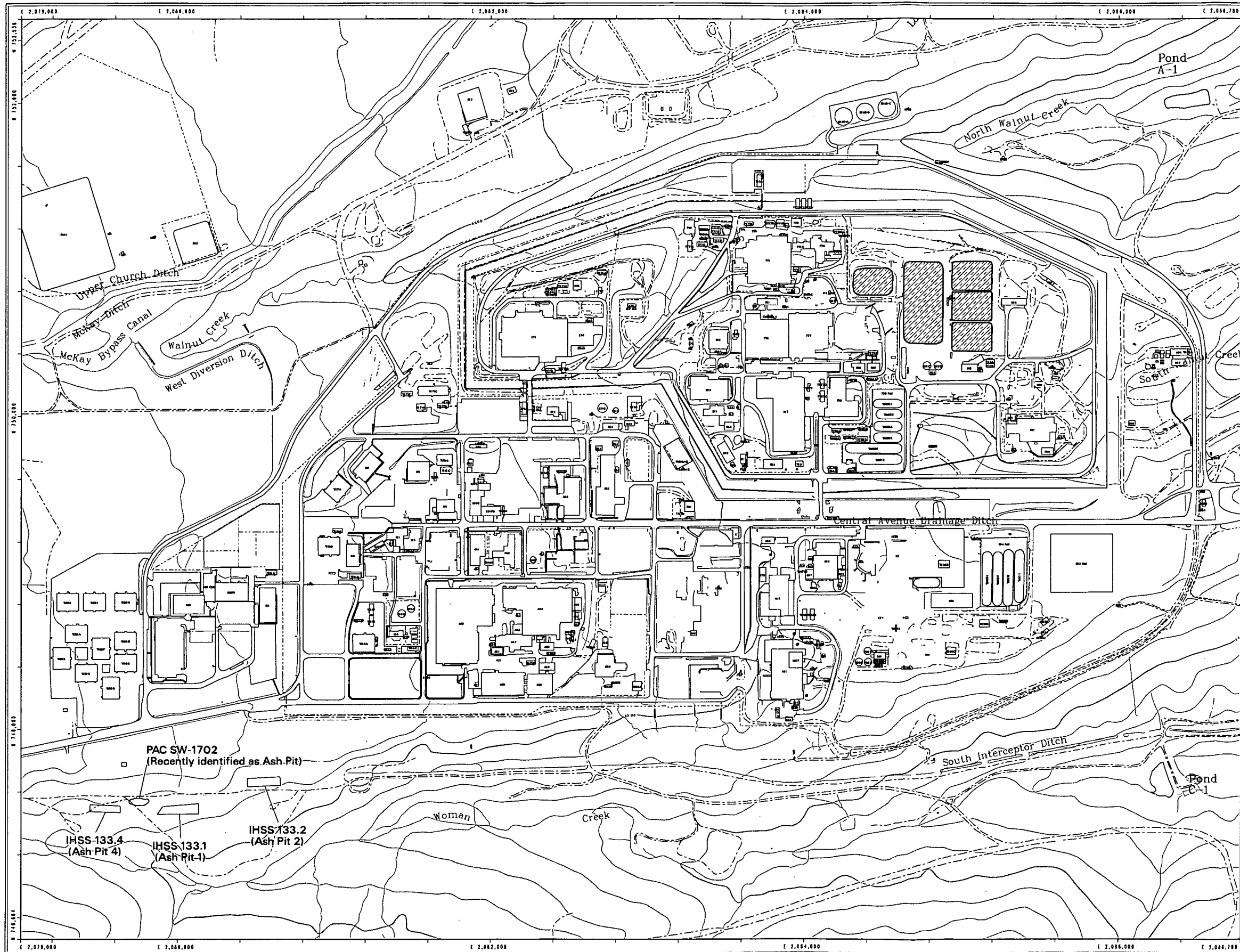
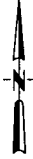



Figure 1
IHSS Location Map

- EXPLANATION**
- IHSS
 - PACS
- Standard Map Features**
- Buildings and other structures
 - Solar Evaporation Ponds (SEPs)
 - Lakes and ponds
 - Streams, ditches, or other drainage features
 - Fences and other barriers
 - Topographic Contour (20-Foot)
 - Rocky Flats Environmental Technology Site boundary
 - Paved roads
 - Dirt roads

DATA SOURCE BASE FEATURES:
Buildings, fences, hydrography, roads and other structures from 1994 aerial imagery data captured by EGA/RGS, Las Vegas. Digitized from the orthophotograph, 1/95.
Topographic contours were derived from digital elevation model (DEM) data by Morrison Knudsen (MK) using ESRI Arc 100 and LATTICE to process the DEM data to create 5-foot contours. The DEM data was captured by the Remote Sensing Lab, Las Vegas, NV, 1994 Aerial Flyover at 10 meter resolution. DEM post-processing performed by MK, Winter 1997.


 Scale = 1 : 7580
 1 inch represents approximately 632 feet

 State Plane Coordinate Projection
 Colorado Central Zone
 Datum: NAD27

U.S. Department of Energy
Rocky Flats Environmental Technology Site
GIS Dept. 303-966-7707

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November 06, 2002

Figure 3
Existing Analytical Results for
Surface Soil and Sediments
For IHSS's 133.1, 133.2,
133.4 and PAC SW-1702

KEY

- IHSS location
- PAC location
- Building/structure
- Paved area
- Dirt road
- Stream, ditch, or other drainage feature
- Surface Soil Sample Location

All depths are in feet below ground surface

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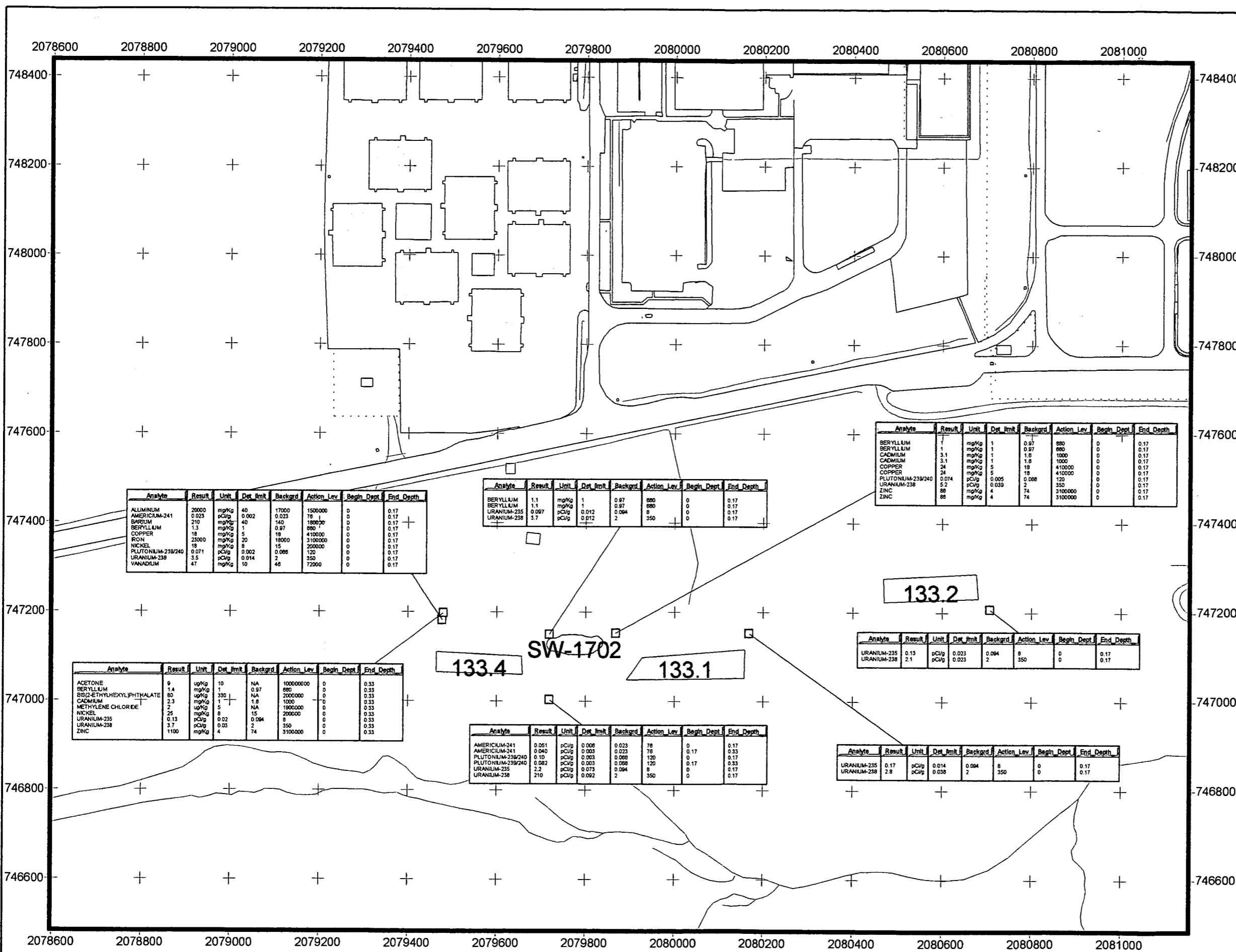
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Scale = 1:2,600
State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD 27

U.S. Department of Energy
Rocky Flats Environmental Technology Site









Prepared by:

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SW-1 Notification Map for Surface Soil.apr
Date: 11/6/02

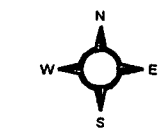


**Figure 5
Remediation Area**

KEY

-  IHSS location
-  PAC location
-  Area of Planned Excavation
-  Building/structure
-  Paved area
-  Dirt road
-  Stream, ditch, or other drainage feature
-  Potential Air Sampling Location

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70 0 70 140 210 Feet

Scale = 1:2,820

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD 27

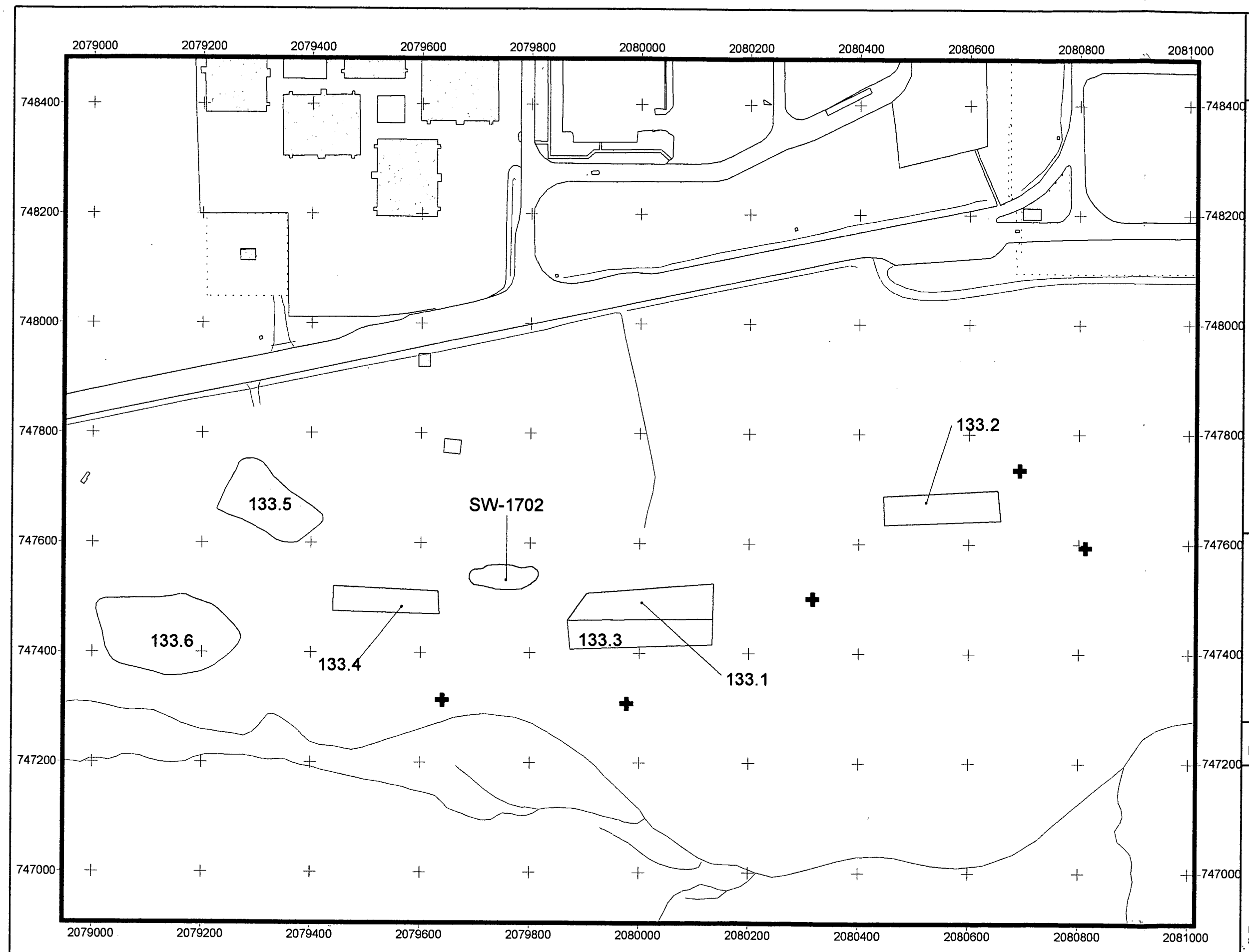
U.S. Department of Energy
Rocky Flats Environmental Technology Site

Prepared by:



File: W:\fy2003\Projects\Sw-1\
SW-1 Confirmation Sample Map.apr

Date: 11/6/02



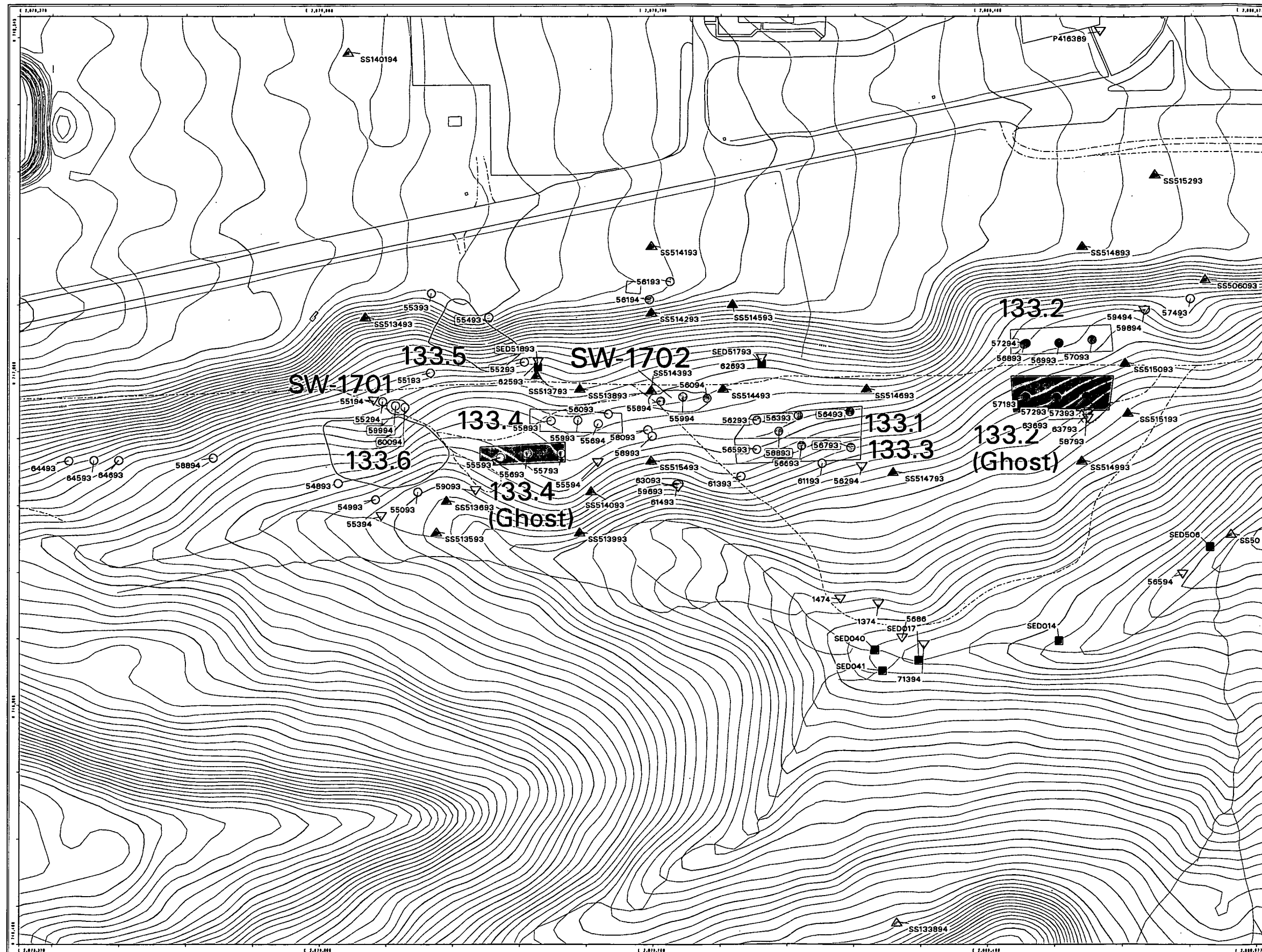


Figure 6
Groundwater Monitoring
Well Locations
IHSS Group SW-1

EXPLANATION

- Subsurface Soil
- ▲ Surface Soil
- Sediment
- ▽ Groundwater Well
- Ash Pit Ghost Location
- Previously designated NFA
- OU5 (IHSS)
- PAC

Standard Map Features

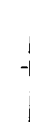
- Streams, ditches, or other drainage features
- Topographic Contour (2-Foot)
- Paved roads
- - - Dirt roads

DATA SOURCE BASE FEATURES:

Buildings, fences, hydrography, roads and other structures from 1994 aerial fly-over data captured by EGIS RSI, Las Vegas. Digitized from the orthophotographs. 1/95
 Topographic contours were derived from digital elevation model (DEM) data by Morrison Knudsen (MK) using ESRI Arc TIN and LATTICE to process the DEM data to create 2-foot contours. The DEM data was captured by the Remote Sensing Lab, Las Vegas, NV, 1994 Aerial Flyover at 10 meter resolution. DEM post-processing performed by MK, Winter 1997.

NOTES:

All IHSS and PAC's boundaries are approximate. For more detail, please contact Environmental Restoration (X4605) for the following document:
 Historical Release Report (HRR) September 2002 Annual Update



Scale = 1 : 2510
 1 inch represents approximately 208 feet



State Plane Coordinate Projection
 Colorado Central Zone
 Datum: NAD27

U.S. Department of Energy
 Rocky Flats Environmental Technology Site

GIS Dept. 303-866-7707

Prepared by:

DynCorp
 THE ART OF TECHNOLOGY

Prepared for:

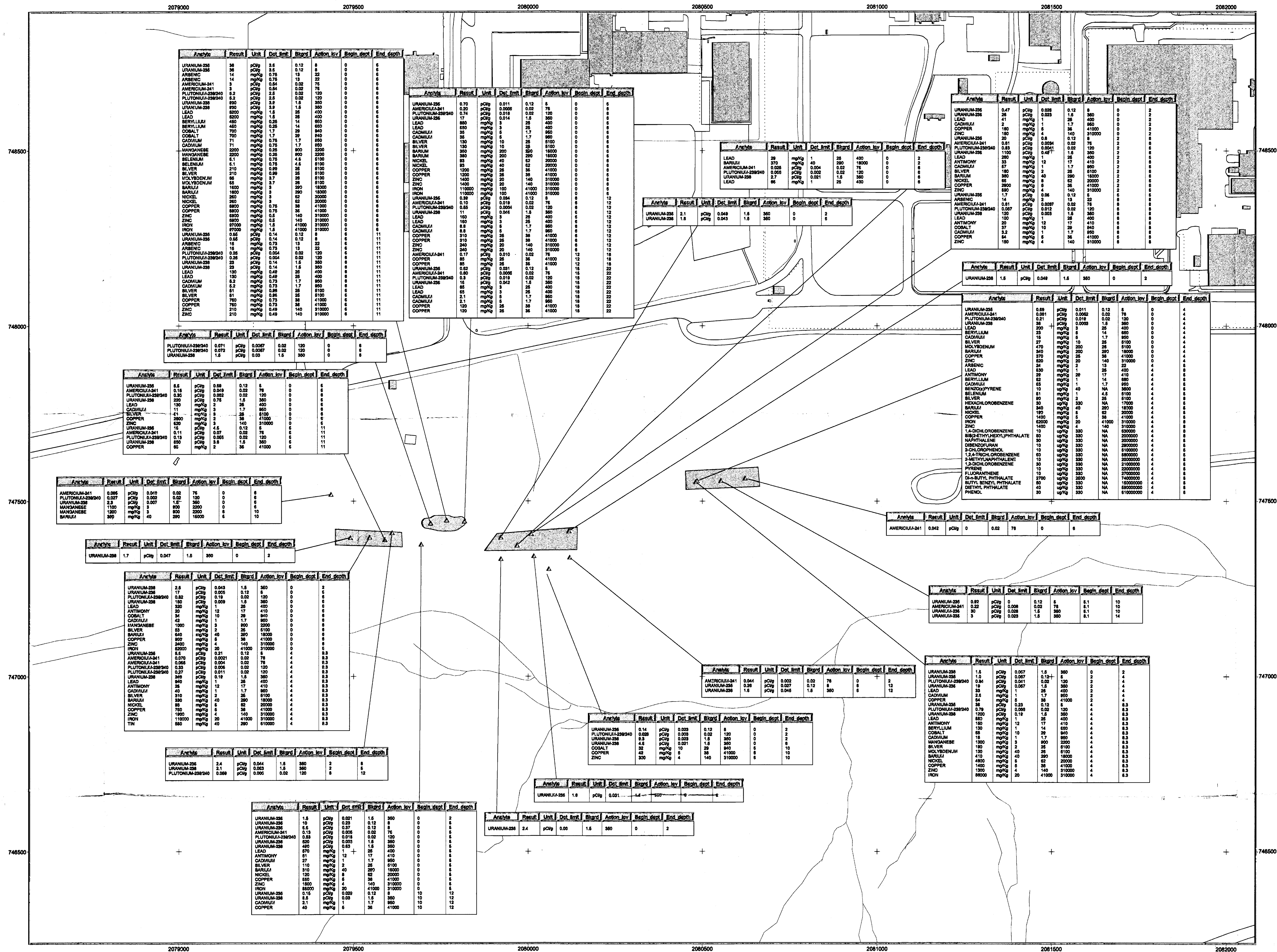
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November 08, 2002

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101
pg 11 BZ-A-000562

Figure 4
Existing Analytical Results for
Subsurface Soil and Sediments
for IHSS's 133.1, 133.2, 133.4,
and PAC SW-1702



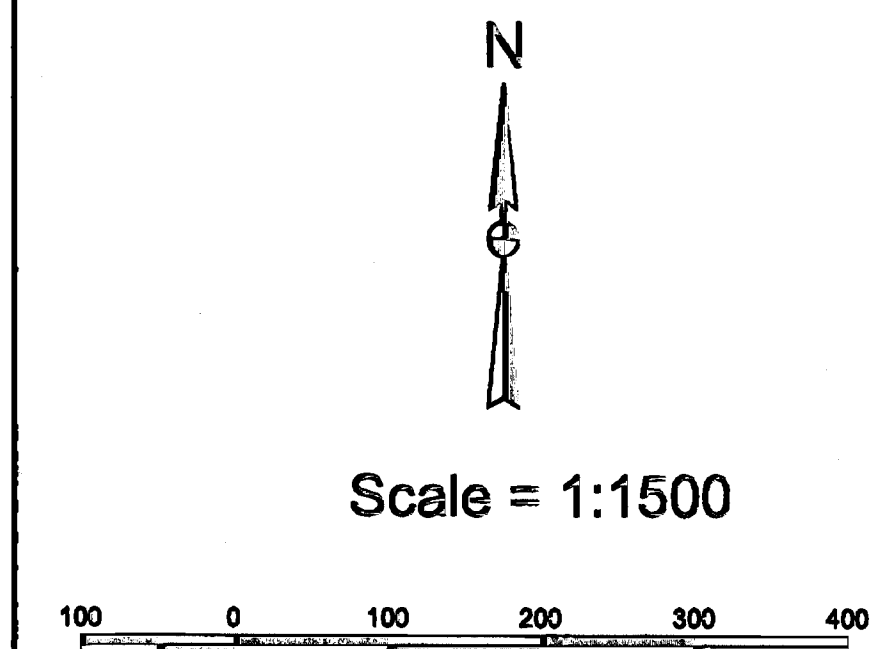
- KEY**
- IHSS location
 - PAC location
 - Building/structure
 - Paved area
 - Dirt road
 - Stream, ditch, or other drainage feature

Existing soil sampling locations

Subsurface soil

All depths are measured in feet below ground surface

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Prepared by:
 RADME
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CONTACT

File: W:\Projects\fy2003\SW-1\Notification\
SW-1 Notification Posting Map for Subsurface.apr

Date: 11/6/02